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ZOOLOGY.

Motion in the Protozoa.—Ryder has some interesting remarks on the contraction of the Vorticellid stalk[1] which has not before been properly understood. The muscle in the stalk is composed of alternating discs of anisotropic and isotropic matter, the former being in contact with the sheath on the inside of the coils, a type unknown elsewhere. Notes are also given on the motion of Trypanosoma.

Morphology of the Siphonophores.—Brooks and Conklin have recently studied[2] the reproductive organs of a Siphonophore belonging to Haeckel's order Auronectæ. The specimens came from near the Galapagos Islands, and were subjected to sectioning. The authors found only female organs, and are inclined to think that Haeckel's "androphores" some long, spindle-shaped gynophores filled with yolk, but into which the egg nucleus had not yet passed, or from which it has been forced out by pressure. The development of the gynophores is described, and the authors conclude that the "monovone gonophores" are true gonophores, while the "polyovone gonophores" are merely pouches containing ova, and are not, strictly speaking, gonophores. The attention is called to the fact that only male Physaliæ have been found, and the suggestion is made that in these two cases the other sex may be so different in form as to have been classed as a wholly different genus.

The Starfish Larva.—In a paper read before the National Academy of Sciences,[3] Dr. Brooks says that in numerous starfish larvæ taken at Wood's Holl, the water system is at first bilaterally symmetrical in every particular, although the right pore and pore canal early disappear. This is regarded as an additional argument for regarding the larva as ancestral, and attention is called to the similarity in ontogeny between the water pores of the starfish larva and the spiracles of Appendicularia and the tunicate tadpole.

Anatomy of the Synaptidæ.—Among the results derived from a study of the six species of Synaptidæ belonging to the genera Synapta, Chirodota, and Myriotrochus, Drs. Ludwig and Barthels conclude[4] that in the adult Synaptid there is no radial water canal; that semilunar valves constructed on the same plane are present in the tentacular canals; that a pair of auditory vescicles are present on each radial nerve where it emerges from the calcareous pharyngeal ring, and these are probably functional in the adult; the so-called eyes of *Synapta vittata* are undoubtedly sense organs, and the pigment spots in other forms are probably the same. These spots in *S. vittata* have a rich nerve supply.

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[1] Proc. Acad. Nat. Sci., Phila., 1891, p. 10.

[2] Johns Hopkins Univ. Circ., X., p. 87, 1891.

[3] Johns Hopkins Univ. Circ., X., p. 101, 1891.

[4] *Zool. Anzeiger*, Vol. XIV., p. 117, 1891.

Genito-Intestinal Canal in Trematodes.—S. Goto confirms[5] Ijima's account of a canal connecting the oviduct, in the ectoparasitic Trematodes, with the intestine. His studies have been made on eleven species representing four genera.

Fertilization in the Cestodes.—Pintner[6] has been very fortunate in finding two proglottids of *Anthobothrium musteli* in copula, and ascertained that a true cross fertilization was taking place. He also found another proglottid of the same worm in which the penis had entered very deeply the vagina of the same joint. These observations show that both close and cross fertilization occurs in these and possibly in all Plathelminthes.

Regeneration in the Oligochætes.—Miss H. Randolph has studied the reformation of the tail in Lumbriculus.[7] She finds that the processes are much like those of the growing embryo, except in regard to mesoderm. When fission occurs the violent contraction of the longitudinal muscles curves the ectoderm and entoderm towards each other, and then a union between the two is effected. The more rapid growth of the ectoderm produces the material for the proctodeum. The ectoderm gives rise to the ventral nerve chain and the lateral nerve line, and between these occur two other anlagen, which correspond in position to the ventral setæ and nephridia, but Miss Randolph has not traced them out. The mesoderm arises chiefly from large cells (neoblasts) in the region of the cœlomic epithelium of the ventral long muscles. These neoblasts represent the chorda cells of Semper, and occur in every segment except a few anterior. From these arise the embryonic mesoderm of the newly forming tail. It soon becomes arranged into a median and two lateral elements. The median becomes the ventral mesentery, and the walls of the ventral blood vessel; the lateral elements form all the lateral mesodermal structures except the circular muscles. These last arise from certain cells whose origin was not traced.

[5] *Zool. Anzeiger*, Vol. XIV., p. 103, 1891.

[6] Arb. Zool. Zool. Inst. Wien., IX., 57, 1890.

[7] *Zool. Anz.*, XIV., 154, 1891.

Distribution of Magelona.—Dr. E. A. Andrews calls attention [8] to the existence of the adult worm Magelona at Wood's Holl, and points out that the larva described by Fewkes from Newport as possibly the young of *Prionospio tenuis* in all probability belongs to this genus.

Budding in Polyzoa.—C. B. Davenport, contrary to Hatschek, says [9] that the stolonic mass in the Polyzoa arises from the ectoderm soon after the two-layered stage, the disc thus forming sinking below the general surface, and giving rise later to the first polypides. The cœlomic epithelium arises by a sort of ingression of a tissue to be probably regarded as mesoderm plus entoderm. In Paludicella each young polypide arises in the adult colony independently of any older polypide. It arises from a mass of embryonic tissue at the end of the branch, and some of this tissue is left behind each time the tip moves forward, and from this arise the lateral branches. As in the Phylactolœmata, the hinder part of the alimentary canal progresses from the anal toward the oral end. The œsophagus arises independently, and the two pockets fuse. The tentacles at first lie in two parallel rows o seven each, and the ectoproctous condition is not attained until the two free ends of the ring canal become confluent between mouth and anus. The so-called epistome described by various authors in early stages of Gymnolæmata has no relation with the similarly named structure in the other forms, but is merely the fold separating the brain cavity from the œsophagus. Eight laws of growth are formulated, based upon Bugula and Crisia as typical.

The Crystalline Style.—This problematical structure in the alimentary canal of many Lamellibranchs has recently been investigated anew by F. E. Schulze.[10] The idea that it is a supply of reserve food material is rejected by him, from the fact, among other reasons, that microscopic study shows it to be an epithelial secretion. He is rather inclined to the view that it, along with the mucous surfaces of the stomach, protects the intestinal walls by covering sand and other sharp particles with a layer of mucus.

The Position of Limulus.—Packard contiues his studies of the brain of Limulus.[11] He claims that the brain differs fundamentally from that of Arachnids, and is homologous with only that part of the scorpion brain which lies in front of the chelical nerves. The histology is described, but is not easy to understand without figures. His conclusions are that the lack of homology between the brain of Limulus and Arachnids, the shape and grouping of the appendages, the absence of urinary tubes, of tracheæ, the presence of branchiæ, forbid the association of Limulus and its fossil allies with the Arachnids, although they may have had a common origin.

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[8] Johns Hopkins Univ. Circ., X., p. 96, 1891.

[9] Proc. Am. Acad. Arts and Sciences, XXV., 278, 1891.

[10] S. B. Ges. Naturforsch. Freunde, 1890, p. 42.

[11] *Zool. Anzeiger*, X., 129, 1891.

The Vertebrate Ear.—Dr. Howard Ayers, from a study of mammalian and sauropsidan ears, concludes[12] concludes that the so-called membrana tectoria of the mammalian cochlea is not a membrane which acts as a damper on the organ of Corti. He rather regards it as an artifact produced from the very long sense hairs of the cells of the cortian organ. The membrana basilaris further is not a vibrating membrane. "The physiological unit of the cochlea is a sensory hair-bearing epithelial cell; the anatomical unit of the cochlea is a group of hair-bearing and supporting cells,—*i. e.*, a sense organ comparable in a word to an ampullar sense-organ." Full details are promised immediately.

Segmentation of the Vertebrate Head.—B. H. Waters thinks[13] that the neuromeres of Beranek and others may be traced into the mid- and fore-brains of Amblystoma and the cod, and he would recognize three neuromeres in the fore-, two in the mid-, and six or five in the hindbrain. The optic nerve is given a segmental value.

Description of a New Species of Catostomus (C. rex) from Oregon.—One specimen, thirty-two inches long, from Lost River, Tule Lake, Oregon, was added last year to the collection of the California Academy of Sciences. The characters are as follows: D. II., 11½; A. II., 6½. Scales, 13–80–8; about 35 before the dorsal. Head, 4; depth, 4. Eye, 8 in head, placed but little posterior to the middle, the snout about 2¼ in head. Head broad, flattish, the cheeks sunken and very long. Mouth small, lower jaw strong, the maxillary spine forming a hump on the snout. Papillæ small, apparantly but two rows on upper lip. Scales peculiar, the basal portions covered with skin. Ventrals rounded, placed below anterior half of dorsal, not reaching halfway to vent. Dorsal as high as long, angular, the last rays but little shorter than the anterior, inserted midway between tip of snout and base of middle caudal rays. Pectorals reaching halfway to ventrals. Caudal peduncle subterete, long. Anal just reaching to caudal. Lateral line interrupted posteriorly. Pharyngeals narrow, the teeth gradually narrower from below upward. Blackish to below the lateral line, many of the scales of the ventral surface dark dotted. Fins blue-black, the paired fins darkest.—R. S. EIGENMANN.

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[12] *Anatom. Anzeiger*, VI., p. 219, 1891.

[13] *Zool. Anz.*, XIV., 141, 1891.

The End of the Urodele Tail.—It has long been known that in the tritons the skeleton of the tail terminates not by a vertebral body, but by a "cartilaginous end rod." This has been said to have no genetic connection with the notochord. Now Barfurth,[14] in studying regeneration in this region, finds that the chorda cells are capable of regeneration in the Urodeles, and that the chorda cells become altered into this terminal element, which he prefers to call "chorda-rod."

The Gila Monster.—Mr. Samuel W. Garman has recently studied [15] a living specimen of this reputedly venomous lizard. It was fed on eggs. It made its burrow in the sand in the box in which it was kept, and it evinced great desire to bask in the sun. It was "really good natured," although it could be teased into a temper. Mr. Garman is very doubtful of its deadly qualities. The venom seems to affect small animals, but to have little danger for larger ones. Several of the well-known accounts of its noxious character are quoted, and then Garman details his own experiments with a cat, less than one-third grown. This the "monster bit twice on the hand and wrist. For half an hour this caused the kitten some distress, and was licked and dressed as usual. Then followed an hour and a half of sleep, from which the kitten woke as bright as ever, the hand being slightly swollen, and in twenty-four hours no ill effects were seen. The same kitten was then bitten again, and later the wounds were studied, but no disintegration or other modifications of the tissue were visible."

Dr. R. W. Shufeldt, in the New York *Medical Journal* of May 23d, 1891, gives a summary of observations made up to date on the structure of the salivary glands, and the effects of the saliva when introduced into wounds. He concludes that the evidence is conflicting. Three good figures accompany the paper.

Recent Researches in the Herpetology of Africa.—The Société Philomatique of Paris has recently published several papers by M. F. Moquard on reptiles and Batrachians from Africa that will interest zoologists, as they come from regions but little represented either in museums or private collections. In the memoir on the reptiles from Somali and Zanzibar[16] the author prefaces his descriptions with the following remarks :

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[14] *Anatom. Anzeiger*, VI., 104, 1891.

[15] Bulletin Essex Institute, XXII., p. 60, 1890 (1891).

"The new collection of reptiles and batrachians reported in 1884 from the Somali country and Zanzibar, by M. G. Revoil, is without doubt the most important of all those which this zealous traveler has sent to the museum during many excursions into regions at that time almost unknown. One of these collections was described many years ago by Professor L. Vaillant. This new one, richer in species, is distinguished by some specific types and interesting genera which appear to be new. Among these types we cite in the Lacertilian order *Hemidactylus tropidolepis*, the dorsal aspect of which is covered with unequal, keeled scales, and not with granulations, as appear upon many of the species of Hemidactylus, or with equal, smooth scales, as *H. homœolepis ;* an Eremias with nostril opened between four nasal plates, and with the dorsal scales keeled, which I have dedicated to Professor Alph. Milne-Edwards, *E. edwardsii ;* a new species of Agamodon, *A. compressum*, characterized by a compressed body and by having the lateral borders of the cephalic shields recurved.

"Besides the new species of Dasypeltis, of slender form, *D. elongata*, the Ophidians contain two Calamarians which we believe represent new genera, the one a relation of Elapomorphus, but without the malar or preorbital constitutes the genus Elaposchema, a name which will suggest its resemblance to Elaps ; the other, slightly removed from Amblyodipsas, and to which I would give, on account of its size, the name Brachyophis, is especially remarkable for the presence of a true occipital plate behind the parietals. It seems proper to dedicate these two new species, *Elaposchema vaillantii* and *Brachophis revoilii*, respectively to M. Vaillant and M. Revoil.

"Among the species already described, but which until now have remained in the museum we cite the following: *Agamodon anguliceps* Peters, *Psammophis biseriatus* Peters, and *Chiromantis petersii* Boulenger ; the first is represented by nine specimens, and the last two each by two.

"In concluding this short introduction, we call attention to the fact that two of the new species of which we have spoken above are burrowers,—*Agamodon compressum* and *Brachyophis revoilii*. One readily believes that other types of similar habits of life, and which have hitherto escaped the researches of explorers, will be found to enrich the herpetological fauna of Eastern Africa whenever a thorough search can be made."

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[16] On a Collection of Reptiles and Batrachians sent from Somali and Zanzibar. By M. G. Revoil. Memoires Publiés par la Société Philomatique à l' occasion du Centenaire de sa Fondation, 1788-1888.

The collection includes thirty-four species, of which twenty are lizards, twelve are snakes, and two are batrachians. Two plates, admirably drawn, accompany the paper, giving in detail the curious appearance of the three new species.

The other papers contain a description of a new snake (*Atractaspis leucura*) from Assinie;[17] a review of the genius Heterolepis, with the addition to it of three new species,—*H. stenophthalmus*, *H. guiralii*, *H. savorgnanii*;[18] and descriptions of snakes[19] and reptiles[20] from the Congo country.

Of the latter, M. Mocquard described thirty-four species, four of which are new,—*Microsoma fulvicollis*, *Coronella longicauda*, *Atheris anisolepis*, and *Gonionotus brussauxii*.

EMBRYOLOGY.[1]

Development of Compound Ascidians.—Dr. M. v. Davidoff has published a second contribution to the above subject, entitled "Untersuchungen zur Entwicklungsgeschichte der Distaplia magnilarva, etc."[2] He deals here with the general formation of the germ-layers. The paper runs through more than a hundred pages, and the author by no means confines himself to the title of the paper, but discusses the development of all other Ascidians, the problem of the mesoderm formation, and touches upon the origin of the vertebrates themselves. The holoblastic segmentation of the egg is described for the earlier stages. The most interesting fact in this connection is the presence of the *test cells* between the segments of the egg for quite a long time during the early stages. Subsequently they disappear, presumably degenerating. A solid mass of cells results from the segmen-

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[17] Sur une nouvelle espèce d'Atractaspis (*A. leucura*). Ext. Bull. de la Société Philomatique de Paris Séance du 28 Novembre, 1885.

[18] Du genre Heterolepis et des espèces qui le composent dont trois nouvelles. Ext. Bull. de la Société Philomathique de Paris, October, 1886.

[19] Sur les Ophidiens rapportés du Congo par la Mission du Brazza. Ext. du Bull. Soc. Philomathique de Paris. Séance du 18 Dec., 1886.

[20] Sur une Collection de Reptiles du Congo. Ext. Bull. de la Soc. Philomathique de la Paris, 8 serie, t. 1, No. 4, page 143.

[1] Edited by Dr. T. H. Morgan, Johns Hopkins University, Baltimore, Md.

[2] Neaples Mittheilungen, IX. Band, IV. Heft.